optimised. Manufacturers also generally provide a full range of ancillary components for use with their sections. The designer's job is then a simple one of picking suitable components to suit the requirements, from a catalogue.

Detailing

Depending on their section size, span and the roof slope, purlins may need to be provided with sag rods. These prevent twisting during erection, and stabilise the lower flange against wind uplift. Different details are used to fix these rods to the purlins (see Figure 6.19). The designer should consider the ease with which the system can be erected, as well as its structural performance, when specifying a detail.

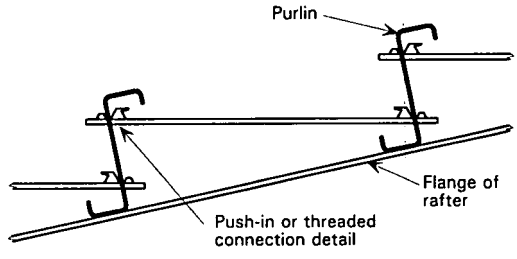

Figure 6.19 *Purlins with sag rods*

Lateral forces on the members can usually be resisted by diaphragm (or 'stressed skin') action of the roof sheeting, so the upper flanges of the purlins can be considered to be laterally restrained by the sheeting when appropriate fixings are used.

Purlins are usually made continuous in order to reduce deflections, but when elastic design is used to size the continuous purlins, an overly conservative section often results. This is because support moments predicted by an elastic analysis are significantly greater than span moments, and the section must clearly be able to resist the greater of the two. In reality some moment redistribution occurs, reducing the imbalance of applied moments and therefore reducing the size of section needed.

Often the most economical way to determine the behaviour of a purlin, allowing for moment redistribution, is by testing. Manufacturers have developed overlapped and sleeved systems, based on testing, which provide increased moment resistance and ductility at supports (see Figure 6.20). Overlaps provide greater moment resistance than sleeves, but they are more expensive because they need to extend further into the span, and this can complicate erection.

When designing for construction, the designer should consider not only ways in which to optimise section behaviour, but also ways in which the work on site can be facilitated. Before specifying a system to strengthen purlins over supports the designer must consider the ease of implementation of the various options which are available to him.

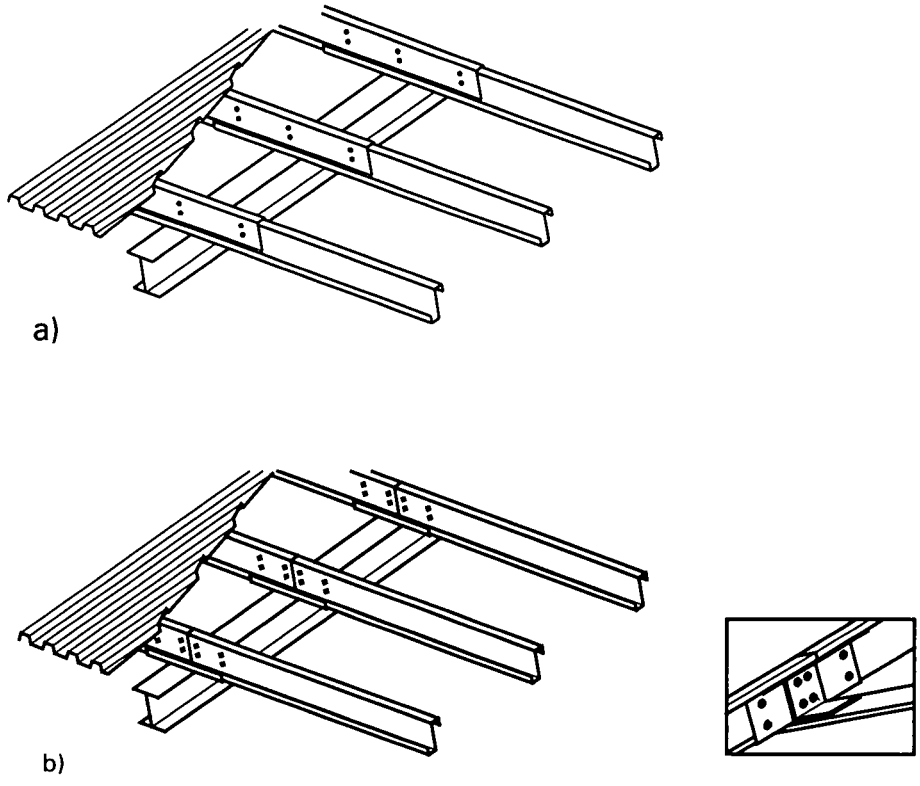

Figure 6.20 *Purlin details at support, a) overlapped b) sleeved*

'Vertical' loads are transferred to the supporting rafters via cleats fixed to the web of the purlin. The cleats are designed so that the lower flange of the purlin does not bear directly on the rafter, thereby avoiding web crippling problems. Holes can be punched in the purlins during forming, and bolts are normally used for fixing to the cleats. In almost all cases the strength of the connection is governed by the bearing capacity of the thinner steel section, rather than by the shear capacity of the bolts. Overlapped or sleeved systems provide a double web thickness at supports, thereby improving the shear resistance of the section.

6.7.2 Other uses

Other structural and non-structural uses of cold formed steel sections in buildings include:

- stud walling and partitions
- floor joists
- trusses
- building frames
- curtain walling
- lintels

A detailed discussion of these uses is given in Reference 49.